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Outcomes and Factors Influencing Relapse and Recidivism in a Rural Substance Abuse Treatment Program Collaborative

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BY

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A doctoral project submitted to the faculty of the Medical University of South Carolina
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"If I have seen further, it is by standing on the shoulders of giants"- Sir Isaac Newton

Abstract of Dissertation Presented to the
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Abstract

Intensive Outpatient programs for mental health and substance abuse have been shown to be an effective option for individuals with substance use disorders. Despite this, there are few options for individuals seeking this form of treatment in rural communities. It is often believed that high quality programs that address the core systemic social issues that underlie substance use disorders are too expensive for small rural healthcare organizations to utilize. This model shows one treatment program that is able to address multiple social safety net issues and produce positive outcomes in a rural setting by leveraging community partnerships, as well as discussing future policy implications.

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CHAPTER I INTRODUCTION

1.1 Background and Need

The United States is currently in the throes of an opioid epidemic that has cost more than half a million Americans their lives (CDC, 2020). Beginning in the late 1990s with the over-prescribing of opioid medication, the epidemic has evolved to include newer, even more deadly synthetic opioids. Hidden beneath the proliferation of opioid abuse deaths, stimulant abuse and fatality rates are also on the rise after several consecutive years of decline due to an increase in "polypharming" or polysubstance abuse. The cumulative effect of these increases has made drug overdose the leading cause of injury related death in the United States, particularly in rural communities (CDC, 2020).

The widespread destruction incurred as a result of the substance abuse epidemic has generated staggering economic and societal losses ranging from rising healthcare costs, overburdened criminal justice and child welfare systems, decline in active workforce participation, as well as increase in substance abuse related morbidity and mortality (Crowley, Connell, Jones, & Donovan, 2019). The National Survey on Drug Use and Health estimated that 12.5 million Americans had used prescription pain medicines for non-medicinal purposes in the previous year (SAMHSA, 2014). The millions of individuals who meet the current DSM (Diagnostic Standard Manual) criteria for substance use disorders accumulate great costs in direct healthcare provision and, without proper treatment, have significantly reduced lifespans and poorer health outcomes (SAMHSA, 2008).

The majority of the cost for the raging substance abuse epidemic is borne by public tax-funded services. In addition to the increasing costs of incarceration and social safety net systems,

Medicaid is the primary payer source for individuals with mental health diagnosis (Medicaid, 2020). One study found that the total cost of healthcare per patient was 30% less for individuals compliant with Opioid Use Disorder treatment than those who were not compliant (Ronquest, Wilson, Montejano, Nadpipelli, & Wollschlaeger, 2018). Additionally, the cost related substance-abuse related conditions such as HIV/ AIDs positive status, Viral Hepatitis C status, and Neonatal Abstinence Syndrome (NAS) also incur billions of additional dollars annually in healthcare spending (National Institute on Drug Abuse, 2020).

1.2 Problem Statement

Opioid use disorder is particularly prevalent in rural America where there exist fewer opportunities for treatment. Additionally, OUD often results in multiple public organizations' involvement including; healthcare, criminal courts, and prisons/jails. Thus, a collaborative multimodal program including and aimed at treating OUD and its consequences in multiple settings is needed.

1.3 Primary Aim and Research Hypotheses

The aim of this study is to examine if a small-scale, social work-based substance abuse treatment programs run by rural healthcare organizations can be effective at reducing substance abuse related fatality, increasing substance use treatment program completion, and decreasing recidivism. We hypothesize that if a comprehensive, evidence-based, community and collaboration-oriented treatment model is implemented in a rural community, then overdose deaths will decrease, successful treatment completion will increase, and return to use will decrease.

1.4 Population

The population that will be examined in this study are recently incarcerated individuals with non-violent substance abuse related offenses who demonstrate high risk of recidivism based on mental health and substance abuse co-occurring diagnosis. In addition, patients of the same criteria who may or may not have criminal offenses but are recognized by the civil court system as having co-morbid mental health and substance abuse diagnosis are also included. The participants are between the ages of 18-65. The program is non-gender specific and has male, female, and non-binary participants comingled. No family members or close pre-existing connections may exist for participation (important in a rural community). All participants live in a single rural county in Indiana.

Participants may enter the program after being determined to meet the American Society of Addiction Medicine (ASAM) criteria for intensive outpatient services. This screening is provided by a licensed mental health practitioner that utilizes the ASAM's criteria for determining appropriate level of care. Patients who score too highly on the ASAM criteria are referred to a higher level of care (Partial Hospitalization Programs or inpatient facilities). Participants who score too low on the ASAM are admitted into an alternative treatment program that provides less intensive services. If at any point during the program the participant's level of need changes, the participant was immediately removed from the program and redirected to the appropriate level of care. In the event that a participant is removed from the program to be transferred to psychiatric inpatient or residential treatment, all their associated data is removed from the study and they are effectively considered removed from the program. If the participant returns to the program after completing a psychiatric inpatient stay, then the data is restarted from the new entry date and previous data remains excluded from the study.

All participants are encouraged to make their own informed choices about Medication Assisted Treatment (MAT) and all forms of MAT are accepted in the program, however only naltrexone and buprenorphine are provided internally. No participants are excluded on the basis of MAT status.

2 CHAPTER II SCOPING LITERATURE REVIEW

Many of the costs associated with the substance abuse epidemic are concentrated most heavily in non-urban areas (Ziller, Anderson, & Coburn, 2010). For example, since 2009, the largest demographic of viral hepatitis C positive patients are non-urban whites between the ages of 20-30 (Stopka, et al., 2017). Lack of treatment options, insufficient social safety networks, and failing infrastructure create unique and costly challenges for rural communities who consistently have higher rates of opioid morbidity and mortality than their urban counterparts. For example, a newborn who meets criteria for NAS can be expected to cost more than three times as much as a healthy infant, spend 3.5 times as long in the hospital, and have higher 30-day readmission rates than from any other cause (Patrick, et al., 2015). Consequently, in the state of West Virginia, 83% of the cost of this care is paid by taxpayer funded Medicaid programs, and the intensity of care required by the infants further strains already collapsing rural obstetrics programs nationally (Umer, et al., 2020).

The increased incidence of opioid overdose deaths is strongly correlated to a lack of treatment providers in rural areas (Haffajee, Lin, Bohnert, & Goldstick, 2019). In 2016, 60% of rural communities did not have a single MAT waivered provider who could prescribe buprenorphine for the treatment of opioid use disorder (Jones, 2017). As of 2021, In Ripley County, Indiana, a rural county of approximately 28,000 residents, there are only two Medication Assisted Treatment providers (SAMHSA, 2021). Only one of the providers is actively utilizing

MAT as part of their regular practice, despite the evidence that it improves treatment retention, reduces risk of relapse, and lowers incidence rate of communicable diseases like HIV/AIDS and Hepatitis C (Kresina & Lubran, 2011). In addition to a stark shortage of MAT providers, rural communities also lag far behind urban communities in number of psychiatrists, psychiatric nurse practitioners, and counselors. According to the Rural Health Research and Policy Center, 91% of rural counties do not have a single psychiatric advanced practice provider, 80% do not have a psychiatrist, and 24% do not have any licensed counselors (Larson, Patterson, Garberson, & Andrilla, 2016). The result of this shortfall in healthcare providers is billions of dollars in downstream macro and micro economic losses (Larson, Patterson, Garberson, & Andrilla, 2016).

Proliferation of the Substance Abuse Problems

In the midwestern state of Indiana, nearly one in every 12 Hoosiers meets the DSM criteria for a substance abuse disorder (Casey & Greene, 2017). The number of overdose deaths in Indiana have doubled since 2010, with a 600% increase in death due to synthetic opioids (National Institute on Drug Abuse, 2020). Ripley County is a rural community of approximately 28,000 in southeastern Indiana. Like most other communities, Ripley County suffers from a lack of mental health provider resources to meet the needs of the community. For comparison, Marion County, Indiana, home to the state capital of Indianapolis (population of 876,862) has a ratio of population to mental health providers equaling 350:1; Ripley County, on the other hand, has a ratio of 1 provider for every 1,900 residents (Robert Wood Johnson Foundation, 2020).

In 2016, a rate of 27.73 individuals per 100,000 died of overdose in Ripley County, a rate significantly higher than the 22.8 per 100,000 that Indiana averaged as a whole. Overdose death rates were also higher for each type of drug, with opioid death rates being twice as high as the state average (24.26 per 100,00 to 11.83 for the state) (ISDH, 2016). Additionally, 87% of

the fatal overdoses in Ripley County contained an additional, unidentified substance indicating a high rate of polysubstance abuse, as well as synthetic drug abuse (ISDH, 2016).

This data is further corroborated by data from the Indiana Department Division of Mental Health and Addiction that shows 44.6% of substance abuse treatment episodes from patients in Ripley County involved methamphetamine (compared to 36.5% for Indiana as a whole) (IPRC, 2019). Ripley County also has problematic scores on high risk traits, such as an elevated rate of child abuse with nearly 1 out of every 4 children being a victim of abuse or neglect before their 18th birthday (IPRC, 2019). In correlation with these statistics, 73.5% of children removed from their homes in Ripley County are due to parental substance abuse (IPRC, 2019).

Current Resource Map

According to the Substance Abuse and Mental Health Service Administration, there is only one additional treatment facility in Ripley County (SAMHSA.gov, 2019). Community Mental Health Center, located in Batesville, Indiana (more than 30 minutes from Versailles), offers individual substance abuse treatment sessions. As of 2020, they do not currently provide MAT in any form (though it is noted they will accept patients who receive medication elsewhere). Additionally, there is limited psychiatric access through this facility. Margaret Mary Health, both in collaboration with the Courts Addiction and Drug Services Program (CADS) and general treatment programs, provides mental health and substance abuse treatment with 5 licensed providers across 3 locations (including Versailles). These services include outpatient treatment, Intensive Outpatient Treatment, MAT, and psychiatric medications and consultations.

As of 2021, there are currently no Partial Hospitalization Programs (PHPs), no recovery housing, no emergency shelters, no inpatient treatment options, and no inpatient substance detoxification programs within either Ripley or neighboring Franklin Counties. Additionally,

there is only one Full Time Equivalent (FTE) psychiatrist servicing more than 65,000 patients. There are also currently no options for adolescent substance abuse treatment.

Current Barriers to Treatment

Lack of Access

The stark lack of access to treatment providers creates long wait times and suboptimal outcomes for patients with substance abuse and growing mental health needs nationwide. There are currently over 115 million Americans living in a designated mental health provider shortage area (Health Resources and Services Administration, 2020). While there is a national shortage of mental health providers, the shortage of providers in Ripley County creates extensive wait times for patients and exacerbates care completion rates for patient populations with acute stabilization needs- such as those in recovery from substance abuse or in active substance use. A single missed appointment could delay care for months as patients are reshuffled into prohibitive provider waitlists.

Payment

While many patients qualify for Medicaid coverage through the state's Affordable Care Act insurance expansion, the barriers to application can be insurmountable. Currently state issued identification, such as a driver's license, must be produced, as well as a birth certificate and proof of current employment (State of Indiana, 2021). In addition, some plans take several months to mature their coverage to a full plan including mental health benefits, while some plans routinely deny higher levels of care than office-based mental health services.

Despite these shortcomings, Medicaid is the number one payer for mental health services - meaning that commercial insurer's coverage of services is even more scattered, cumbersome, or prohibitive to treatment (Shirk, 2008).

Safety Net Services

Transportation

Lack of access to transportation in rural communities is a well-documented barrier to treatment. Lack of providers and low population density areas leads to long travel distances between each viable treatment center. Time spent in transit is a barrier, but rural communities also have significantly fewer resources for individuals who do not have reliable modes of transportation (Beardsley, Wish, Fitzelle, O'Grady, & Arria, 2003). In fact, transportation is so critical to health outcomes that the Robert Wood Johnson Foundation published a brief in 2012 summarizing their research and declaring lack of access a social determinate of health (Robert Wood Johnson Foundation, 2012). Another study found that the distance to treatment was not a significant indication of whether or not a patient would remain engaged in outpatient substance abuse and mental health services- instead, they found that access to free public transportation proved to be the biggest factor (Whetten, Pence, Reif, Conover, & Bouis, 2006). However, public transportation has ceased to exist, or has dramatically reduced, in most rural communities. Decreases in population density due to declining birthrates and outmigration, as well as rising fuel costs, has made maintaining public bus systems and taxi services unsustainable in most rural communities (Federal Highway Administration , 2001). This lack of transportation infrastructure has led to significant challenges in retention of participants in mental health services, as well as subsequent reduction in workforce participation and worsening health outcomes.

Housing

Homelessness in rural America is difficult to define and even harder to study. There is a significant gap in research in this area, and the research that exists often undercounts the severity of the issue for several reasons. First, higher rates of transitional homelessness manifest

differently than in urban communities. Often, individuals who experience this type of homelessness are “doubled-up” with friends or relatives and are not able to readily identify themselves as experiencing housing insecurity (HRSA, 2014). Additionally, rural homelessness differs in its high rates of substandard housing and lack of access to government subsidized alternatives. In 2012, the Housing Assistance Council released a report indicating that nearly 1.5 million rural American households were rated as either substandard or extremely substandard-many having no access to modern indoor plumbing (Housing Assistance Council , 2012).While the general lack of public housing is already challenging in rural communities, state policies limiting government subsidized alternatives for individuals with felony histories further complicates housing insecurity for the recently incarcerated. Therefore, it serves as no surprise that recently incarcerated individuals referred by the criminal and civil justice systems for mental health evaluation face 40 times the rate of homelessness compared to the general population (Broner, Lang, & Behler, 2009).

In 2009, a study was conducted on individuals who participated in a Mental Health Court model to see if homelessness affected the rate of recidivism and completion of treatment for individuals in the program (Broner, Lang, & Behler, 2009). Participants in the program were followed for 12 months -post diversion and were provided with support, such as case management services. The study included 500 individuals who were housed, and 89 individuals who were homeless. The study found that homelessness status did not significantly predict program graduation or re-arrest. However, housing instability was found to have significant negative effects on outcomes, arrests, and non-graduation rates for both homeless and housed individuals (Broner, Lang, & Behler, 2009).

While it was found that housing instability, rather than homelessness, predicted poor outcomes, there is a great discrepancy in the numbers of individuals studied. There are nearly 400 more individuals who were not classified as homeless. Additionally, there is limited clarity on potential confounding factors between the two populations. The study postulates that the lack of ability for homelessness to directly predict recidivism, despite its clear relationship, is due to other factors. For example, patients who experience homelessness are less likely to be compliant on medication regiments, and vice versa. Patients who are not compliant on psychiatric medication regimens are significantly more likely to reoffend (Draine & Solomon, 1994). It is important that the study connects these factors because each of them interdependently may have more effect on a patient successfully completing a 12-month Mental Health Court model than homelessness directly. However, in spite of the presence of potentially confounding circumstances, the link between the recently incarcerated, homelessness, and poor outcomes is clear. Additionally, the benefit of social services in addressing these issues to improve outcomes was also demonstrated.

Food Insecurity

While rural America is often associated with images of sprawling farmland, rates of food insecurity are second only to inner city metropolitan areas (Piontak & Schulman, 2014). Food insecurity is primarily an issue of poverty and is highest among the unemployed, under-employed, and wage workers (Piontak & Schulman, 2014). This study by Piontak and Schulman is especially salient due to its relationship with the recently incarcerated and criminally involved populations, which are significantly more likely to experience employment challenges. An additional longitudinal study on former prisoners similarly reported significant barrios among the subjects to even meet the minimal needs for shelter and food and that long term economic

stability was rarely accomplished(Harding, Wyse, Dobson, & Morenoff, 2014). Moreover, another study in the state of Florida found a correlation between individuals who had higher rates of food insecurity and the inability to manage chronic health conditions due to the added financial burden of health-care costs (Bradley, Vitous, Walsh-Felz, & Himmelgreen, 2018). Subsequently, individuals with substance abuse offenses and increased food insecurity were significantly more likely to recidivate both for new substance abuse offenses as well as additional petty crime such as theft (Tuttle, 2019).

3 CHAPTER III METHODOLOGY

3.1 Research Design

This study will utilize a mixture of quantitative and descriptive data to describe the design and evolution of a single rural treatment program, examine results and the collective impact, and discuss policy changes and pertinent challenges. The descriptive cohort design was chosen for the purposes of exploring the progression of the program over the two years included in the study, including multiple revisions to curriculum and included services and the rationale for these changes. The goal of this study is to provide practical application and focus, by developing a comprehensive and replicatable blueprint for other communities to follow.

3.2 Aims and Hypotheses

We hypothesize that if a comprehensive, evidence-based, community and collaboration-oriented treatment model is implemented in a rural community, then overdose deaths will decrease, recidivism will decrease, and treatment success will increase.

3.3 Sample Selection

The sample included in this study is every participant from a single from from October 1, 2018 to March 1, 2020. Both male and female participants referred from the Department of Children Services or from Community Corrections are included, as well as all ages between 18-65 years of age. Participants were included if they met the criteria for Intensive Outpatient level of care on the American Society of Addiction Medicine (ASAM) standardized assessment tool. Exclusion criteria was limited to individuals who were transferred from the program to a higher level of care due to acute and unactipated destabilization and who also did not return to the

program for step-down services, or individuals who did not meet ASAM criteria for Intensive Outpatient treatment.

3.4 Instrumentation

Data for the program was collected from October 1, 2018 to March 1, 2020, via the reporting function for Cerner within a single community medical center. The selection criteria for defining therapy visit data included every appointment with the program provider. These appointments were then sorted into subtypes by billing codes and appointment type (i.e. individual therapy session 60 minutes or group psychotherapy minutes). Data pertaining to positive urine drug screens was collected from Community Corrections reports. Participants who entered the program from sources other than corrections may not have complete urine drug screen data. Patients who were excluded due to transfer to inpatient or residential facilities were manually removed from the dataset.

3.5 Data Set Description

Discrete data elements include study patient identifiers (de-identified) and demographics, service type, age, insurance type, dates of service, number of visits and diagnosis codes. Further data such as MATstatus was manually collected by providers so as to include data from outside sources as well as internal reporting for prescriptions written by system providers. Graduation rates were attained from patient discharge summaries. The status of minor children in the home or pregnany status was self-reported and recorded during the psychosocial evaluation.

Table 1: Data Dictionary

Data Element	Source	Data Type
Education status (last level of formal education completed)	Electronic Health Record	Categorical Data
Referral Source (Criminal Court, Civil Court, Self-Referral)	Electronic Health Record/ Recorded at Intake	Categorical Data
Sexual Orientation (Lesbian, Gay, Bisexual, Transexual, Questioning, Other)	Electronic Health Record/ Reported at Intake	Categorical Data
Race (Caucasian, Black, Latino, Asian, Native American, Pacific Islander, Other)	Electronic Health Record/ Reported at intake	Categorical Data
Gender (Male, Female, Non-Binary, Other)	Electronic Health Record/Reported as part of intake	Categorical Data
Age (18-65)	Electronic Health Record/Age of participant at initial intake	Continuous
Number of Completed Psychotherapy Sessions including Individual Psychotherapy, Group Psychotherapy, and Intensive Outpatient Psychotherapy sessions)	Electronic Health Record and billing records	Count Data
Time in Treatment (months)	Electronic Health Record	Continous Data

Number of Positive Weekly Urine Drug Screens During the Course of the Program	Probation Reports/ Electronic Health Record	Count Data
Number of Mental Health Diagnoses During the Course of the Program	Electronic Health Record	Count Data
Primary Payer Source (Medicaid or MCO, Medicare,Commercial payer, Unisured)	Electronic Health Record	Categorical Data
Dichotomous Indicators of social determinates (at Program Start): -Homelessness -Food insecurity -Domestic violence	Self reported or recorded via Electronic Health Record	Dichotomous Data
Dichotomous Indicators for Comorbid Diseases: - Biopolar Disorder - Depression - OCD - Anxiety	Clinical psychiatric assessment via the Electronic Health Record	Dichotomous Data

3.6 Data Collection/Procedure

Demographic information on the patients (age, gender, number of participants, LGBTQ+, and referral source) will be retrieved from our Electronic Health Record (EHR) system utilizing standard system reporting. Urine drug screen data is retrieved both from probation records as well as the EHR system. Education status, employment status, food insecurity, and housing insecurity are all self-reported. Psychiatric compliance, diagnosis codes, and MAT status were also pulled from the participant medical record. During the course of the study, the group

treatment rogram was held Mondays, Wednesdays, and Fridays from 5:00pm-8:00pm. Urine drug screens were performed prior to group session. Unannounced home visits were conducted by probation and DCS agents throughout the week where additional urine drug screens and saliva screens were performed. Blood analysis for substances were conducted as part of routine psychiatric care. Hair follicile screens were performed at random. Breathalizer screens were given daily, sometimes multiple times per day, per judges order for individuals whose substance of choice was alcohol only. Individual therapy sessions were conducted 1-2x per week and were booked around the patient's schedule. Case management, peer support, and wraparound services were conducted on an as-needed basis, encompassing both normal clinic hours and weekend and afterhours.

Data collected on patient demographic information, MAT status, medical and psychiatric history, length of treatment, and insurance status were all collected from the intake, during the course of treatment, and from the patient medical record. Information from outside sources, such as referral source (criminal or civil court referral) and urine drug screens, was also utilized from regular case staffing and reporting from community corrections and the Department of Child Services. Participants in the program were considered "successfully completed" based on extended period of abstinence, participation in treatment sessions, progress towards treatment plan goals, and a decrease in overall clinical acuity allowing for transition to low intensity outpatient services or peer support services. Discharge criteria included participation in 6 weeks of peer support and continued absitinence even with decreased services. For all treatment services, abstinence was defined as non-positive oberserved 10 and 12 panel urine drug screens with laboratory verification, non-positive and timely breathalizer tests, and non-positive hair and blood analysis screens. Completing all phases of the program and experiencing a decrease in

acuity indicating the appropriateness of a lower level of treatment services was the criteria for successful completion.

3.7 Protection of Human Subjects

Study is exempt from IRB review due to its status as a quality improvement study that does not involve patient identifiers.

3.8 Statistical Analysis Methods

Descriptive statistics of the study cohort will be reported as count and frequencies for categorical data, and mean, standard deviations, and range for continuous measures.

The hypothesis of opioid overdose death, recidivism, and treatment adherence (any return to use) will be tested against average rates reported in the literature. Tests of binomial proportions will be used to compare program rates to general rates. Opoid overdose death rates within the program time period will be compared with the CDC reported rate of 22 deaths per 100,000 population in rural communities as a whole, as well as the gender-specific rates of 29.9 per 100,000 for males and 15.5 per 100,000 for females (CDC, 2019). Recidivism rate from the program will be compared to population recidivism of 70% in substance users on probation without access to cognitive behavioral therapies (Deitch, Koutsenok, & Ruiz, 2000). Treatment success during the program will be compared with a population 6-month program success rate of 33% (Fishman & Reynolds, 1999)

4 CHAPTER IV RESULTS or JOURNAL MANUSCRIPT

4.1 Results/Findings

Description of Program, Timing, and Changes Made

On October 1st, 2018, the program began as an intensive outpatient dual diagnosis treatment program. The group sessions ran Monday, Wednesday, and Friday from 5:00pm-8:00pm. Shortly after the program began, the acuity of the patients made additional individual trauma processing therapy sessions necessary. Additionally, the large demand for services led to the utilization of peer coaches to help manage the treatment sessions that occasionally held as many as 12 participants. The participants were accepted to the program on a rolling basis. As a spot came open, it was immediately filled. Graduation was predicated on progress and reduction of symptoms, so the program length varied by severity of illness and participant's individual progress.

Within a week of the program's inception on October 1st 2018, it became apparent that many of the individuals participating were struggling with various levels of food insecurity. Many individuals conveyed that they had very limited or no access to fresh foods, while a subset of the original group indicating having limited or inconsistent access to food generally. We first began to address this by distributing healthy box lunches that were made by the hospital cafeteria for providers during treatment sessions. Program staff also purchased food items to send home with patients during this time. However, neither of these approaches were sustainable long term. By the fall of 2019, the program had partnered with the state of Indiana to implement Cooking Matters curriculum. This curriculum is a teaching course designed to educate low-income participants on nutrition and how to acquire fresh food at low prices. It also comes with grant funding that allowed the purchase of basic cooking equipment and weekly fresh groceries,

virtually eliminating food insecurity for participants who routinely showed up for services.

Transportation was also identified as a significant barrier. Many individuals who are charged with substance abuse related crimes have their driving privileges revoked. In rural Indiana, there is no public transportation system- no buses, cabs, or subways, etc. While there is a local transportation service that provides discounted rides to individuals with Medicaid, the costs of utilizing this program for the entire duration of treatment was extensive. In the summer of 2019, the program sought out and received outside grant funding to help offset costs of utilizing the transportation services for program participants. Individuals engaged in the program were given tokens that represented their number of treatment sessions for the week to aid in transportation. One shortcoming of this model is that the tokens did not cover other essential transportation services- like transportation to the grocery store or dentist.

Housing continues to be a barrier to treatment within the program. Many participants are forced to return back to unhealthy environments during the course of treatment due to lack of affordable housing options. Currently, Ripley County has no emergency shelters. The domestic violence shelter located within the county has been an excellent partner, but they took experience more demand than they can meet given their current resources. This can make it very challenging to find affordable, safe, and substance free housing for participants in the program and likely decreases success overall.

In the future, the program is exploring the idea of procuring grant funding to allow participants to have an electronic device that is secured in order to better facilitate hybrid treatment models. These online and in-person combination programs have become a necessity during the COVID-19 outbreak, but have also helped to mitigate challenges regarding transportation and childcare for participants.

Descriptive Statistics of Study Cohort

The aim of the study was to examine whether or not implementing a collaborative substance abuse and mental health treatment program in a rural community would increase overall treatment success and compliance, significantly reduce overdose deaths, and decrease return to use. Of the 51 particiants included in the study, 34 or 66.67% successfully completed the program with only 33% of that same number experiencing failure to complete. Participants were considered successful if the ASAM criteria (indicated below) showed a reduction in clinically appropriate level of treatment from Intensive Outpatient to Outpatient.

Table 2: ASAM Criteria (The American Society of Addiction Medicine, 2021)

Levels of Care Criteria	**Outpatient**	**Intensive Outpatient**	**Medical Monitoring (some medical management/ residential treatment)**	**Medical Management (24 hour medical observation/inpatient)**
Intoxification/ Withdrawal	No risk	Minimal	Moderate risk	Severe risk
Medical Complications	No risk	Manageable	Some medical risk-requires monitoring	24-hour acute medical care required
Psychiatric Complications	No risk	Mild severity, manageable with patient cooperation	Some psychiatric risk- requires monitoring	24-hour psychiatric monitoring required
Readiness for Change	Cooperative	Cooperative but requires structure	Moderate to high resistance to change	
Relapse Potential	Sustained period of abstinence	Needs close monitoring	Unable to control return to use outside of structured environment	
Recovery Environment	Supportive		No capacity for outpatient	

Chi square tests were utilized to assess whether different descriptive variables had a higher correlation to the successful completion of our program. The only variable that had a significant P-value was whether or not the patient experienced multiple returns to use during the program on successful completion ($P < .0011$). Of the 31 participants who successfully completed the treatment, 65% (22/34) did not experience a return to use, 35% (12/34) experienced a single return to use, and 0% had more than one return to use. For the participants who did not successfully complete treatment, 41% did not experience a return to use, 24% experienced one return to use, and 35% experienced multiple returns to use. Age and gender did not significantly play a role in whether a patient was successful in the program. Patients who were referred by the Criminal Court had a higher rate of completion that those referred by the Civil Court (odds ratio was 2.13). Patients who also had access to psychiatric treatment and was compliant with the treatment regimen led to a higher successful completion rate of the program (odds ratio was 3.13).

The total sample for the study was 51 individuals who were seen as part of the dual diagnosis program between October 1st 2018- March 1st, 2020. The gender distribution was roughly equal with slightly more males than females (51% verses 49%). 31% of the participants engaged in the program were reincarcerated or recidivated. 66% of the participants successfully completed an average of 6.17 months (SD 3.7) of treatment and were released upon decrease of clinical acuity as described by the ASAM criteria, representing an average of 31 completed treatment sessions (SD 19.85).

Table 3. Descriptive Statistics of Cohort

	Successful Completion (N=34)		Non-Successful Completion (N=17)		Total (N=51)		
Variable	**N**	**%**	**N**	**%**	**N**	**%**	**p value**
Age							**0.597**
18-25	**4**	**12%**	**4**	**24%**	**8**	**15%**	
26-33	**16**	**47%**	**9**	**53%**	**25**	**49%**	
34-42	**8**	**24%**	**3**	**18%**	**11**	**22%**	
43-50	**3**	**9%**	**1**	**5%**	**4**	**8%**	
50+	**3**	**9%**	**0**	**0%**	**3**	**6%**	
Gender							**0.322**
Male	**19**	**44%**	**7**	**41%**	**26**	**51%**	
Female	**15**	**53%**	**10**	**59%**	**25**	**49%**	
Social Determinants of Health							**0.91**
Housing Insecurity	**9**	**26%**	**4**	**24%**	**13**	**25%**	
Food Insecurity	**7**	**21%**	**4**	**24%**	**11**	**21%**	
Domestic Violence	**8**	**24%**	**5**	**29%**	**13**	**25%**	
Pregnancy Status							**0.77**
Pregnant	**5**	**15%**	**2**	**12%**	**7**	**14%**	
Non-pregnant	**29**	**85%**	**15**	**88%**	**44**	**86%**	
Parent of Minor Children							**0.32**
Participant has Minor Children	**13**	**38%**	**9**	**53%**	**22**	**43%**	
Participant does not have Minor Children	**21**	**62%**	**8**	**47%**	**29**	**57%**	
Referral Source							**0.50**
Criminal Court	**30**	**88%**	**16**	**94%**	**46**	**90%**	
Civil Court	**4**	**13%**	**1**	**6%**	**5**	**10%**	

Payer Source							**0.44**
Medicaid	**30**	**88%**	**17**	**100%**	**47**	**92%**	
Medicare	**1**	**3%**	**0**	**0%**	**1**	**2%**	
Commercial	**2**	**6%**	**0**	**0%**	**2**	**4%**	
Uninsured/ Self-Pay	**1**	**3%**	**0**	**0%**	**1**	**2%**	
Psychiatric Treatment History							**0.68**
Had Access to Psychiatric Treatment	**15**	**44%**	**5**	**29%**	**20**	**39%**	
Was Compliant with Psychiatric Treatment	**12**	**35%**	**2**	**12%**	**14**	**27%**	
Utilized MAT	**14**	**41%**	**5**	**29%**	**19**	**37%**	
Comorbid Conditions							**0.42**
Dual Diagnosis	**33**	**97%**	**16**	**94%**	**49**	**96%**	
Bipolar Disorder (Types 1 and 2)	**10**	**29%**	**1**	**6%**	**11**	**21%**	
Major Depressive Disorder	**15**	**44%**	**3**	**18%**	**18**	**35%**	
General Anxiety and/or Panic Disorders	**17**	**50%**	**3**	**18%**	**20**	**39%**	
Obsessive Compulsive Disorder	**3**	**9%**	**1**	**6%**	**4**	**8%**	
ADHD/ADD	**8**	**24%**	**2**	**12%**	**10**	**20%**	
Trauma History							**0.79**
Documented History of Physical, Emotional, or Sexual Abuse	**28**	**82%**	**10**	**59%**	**38**		
Post-Traumatic Stress Disorder	**26**	**76%**	**8**	**47%**	**34**	**67%**	
Return to Use							**0.0011**
Did not Experience Return to Use During Program	**22**	**65%**	**7**	**41%**	**29**	**57%**	

Experienced a Single Return to Use	**12**	**35%**	**4**	**24%**	**16**	**31%**
Experienced More than 1 Return to Use	**0**	**0%**	**6**	**35%**	**6**	**12%**
Outcomes						
Recidivism						**31%**
Overdose Fatality						**0**
Program Successful Completion						**66%**

Table 4

	Mean	**Standard Deviation**
Age of Participant	33.08 years	9.20 years
Length of Treatment (Months)	6.17 months	3.70 months
Number of Completed Treatment Sessions	31 sessions	19.85 sessions

Recidivism

Of the 46 participants who were referred to the program from criminal courts, 16 returned to jail or prison within the 6-month treatment perior (34.78%). When compared to population recidivism of untreated individuals (70%), the program had a statistically small return to jail or prison (95% CI 21.35% to 50.25%, $p<0.0001$).

Program Successful Completion

The program resulted in 66% of participants successfully completing 6 months of treatment. When comparing this rate to the comparative published study rate of 33% (REF), we found the program had a third higher success rate, resulting in a statistically significant success rate (95% CI 51.39% to 78.68%, $p<0.0001$).

Death from Overdose

Finally, 0 patients experienced an overdose during the course of treatment, regardless of successful program completion. The CDC reported rate of 22 deaths per 100,000 population in rural communities as a whole, as well as the gender-specific rates of 29.9 per 100,000 for males and 15.5 per 100,000 for females (CDC, 2019).Therefore, the expected overdose rate would be roughly 6.16 for Ripley county. However, as previously mentioned, 0 individuals experienced an overdose death during the data collection period of 8/1/2018-3/1/2020.

5 CHAPTER V DISCUSSION

5.1 Discussion of Results

As previously stated, the program was statistically very successful verses broader rural benchmarks for similar services, even though indiviuals enrolled in the program were very high acuity based off substance of choice, path of usage, and comorbidities. One significant difference is how this program approaches treatment, providing incredibly intensive services as well as wraparound services to address systemic issues such as housing insecurity, food insecurity, domestic violence, and intensive trauma treatment approaches. Considering Medicaid was the primary payer and has notoriously low rates compared to commercial payers, this level of service was only made possibly by leveraging community partners and working very closely with criminal justice and DCS representatives.

Another interesting data trend is that participants who completed the program successfully reported higher levels of every comorbid mental illness in which data was collected, as well as higher rates of trauma and trauma response. While on this surface this seems counterintuitive, it may indicate that underreporting symptoms is a factor for repreated relapse and non-completion of the program-particularly given that participants often were required to complete the program as a condition of probation or restoration of parental rights. It could also be indicative of the pre-contemplative stage of recovery, or a decrease in readiness to change.

5.2 Limitations

One significant limitation on this study is that all data was collected from a growing and evolving program. During the course of the study, no two cohorts of participants ever had the exact same experience. Upon the program's inception, for example, food insecurity was

identified as a significant barrier to treatment success. Therefore, food give-aways were implemented during the second cohort of patients that may have skewed the food insecurity data as time went on.

Another significant limitation is the small sample size that made it difficult to observe the relationships between independent data points or understand them as part of a larger trend. More longitudinal data should help clarify if relationships visible in the data sustain when the numbers are larger or if they are merely a function of coincidence and small sample size.

5.3 Future Research

In many ways, this study is an introductory look at a novel program design that leverages existing community resources to provide a low-cost and high-success program in a rural community. As such, the data sparks more questions than it can answer and there is many opportunities for further, more refined studies that drill down on various subparts of this study. For example, the relationship of PTSD, child abuse, and cooccurring substance abuse and mental health conditions. Additionally, other questions related to historically understudied populations like the rural LGBTQ+ and their relationship with trauma and substance use. Last but not least, the effects of poverty underscore many of the barriers facing those in substance abuse treatment, and, in absence of those barriers, appears to reduce returns to use and recidivism- a point which has significant implications for policymakers and social safety net programs alike. Further examination of the specific relationship of the absence of food insecurity, housing insecurity, and transportation on program completion, as well as how the reduction of each of those variables predicted successful program completion, is also worthwhile.

5.4 Conclusions

The overarching conclusion is that a small rural program, with help from community partners, can be successful at curbing substance use and substance use-related deaths. This study could be used to inform communities that are interested in increasing the number of substance abuse services in a meaningful, yet affordable way. It could also be used by policymakers to reimagine the way substance use programs in small communities are reimbursed, incentivizing trauma-informed programs and overcoming community silos to improve outcomes and resource utilization efficiency.

4 References

Beardsley, K., Wish, E. D., Fitzelle, D. B., O'Grady, K., & Arria, A. M. (2003). Distance traveled to outpatient drug treatment and client retention. *Journal of Substance Abuse Treatment*, 279-285.

Bradley, S., Vitous, C. A., Walsh-Felz, A., & Himmelgreen, D. (2018). Food insecurity and healthcare decision making among mobile food pantry clients in Tampa Bay. *Ecology of Food and Nutrition*, 206-222.

Broner, N., Lang, M., & Behler, S. (2009). The Effect of Homelessness, Housing Type, Functioning, and Community Reintegration Supports on Mental Health Court Completion and Recidivism. *Journal of Dual Diagnosis*, 323-356.

Casey, B., & Greene, M. S. (2017). Substance Abuse Trends in Indiana: A 10-Year Perspective. *The Center for Health Policy at the IU Richard M. Fairbanks School of Public Health*.

Centers for Disease Control and Prevention. (2020, August). *Opioid Basics- Data*. Retrieved from Drug Overdose Deaths: https://www.cdc.gov/drugoverdose/data/statedeaths.html#:~:text=In%202018%2C%2067%2C367%20drug%20overdose,2018%20(20.7%20per%20100%2C000).

Crowley, D. M., Connell, C. M., Jones, D., & Donovan, M. W. (2019). Considering the Child Welfare System Burden From Opioid Misuse: Research Priorities For Estimating Public Costs. *The American Journal of Managed Care*, S256-S263.

Draine, J., & Solomon, P. (1994). Jail Recidivism and the Intensity of Case Management Services Among Homeless Persons with Mental Illness Leaving Jail. *The Journal of Psychiatry & Law*, 245-261.

Federal Highway Administration . (2001). *Planning for Transportation in Rural Areas.* Bellevue, WA: Dye Management Group.

Haffajee, R. L., Lin, L. A., Bohnert, A. S., & Goldstick, J. E. (2019). Characteristics of US Counties With High Opioid Overdose Mortality and Low Capacity to Deliver Medications for Opioid Use Disorder. *JAMA Netw Open*.

Harding, D., Wyse, J., Dobson, C., & Morenoff, J. (2014). Making Ends Meet After Prison. *The Journal of Policy Analysis and Management*, 440-470.

Health Resources and Services Administration. (2020, May). *Health Professional Shortage Areas (HPSAs)*. Retrieved from Shortage Designation: https://bhw.hrsa.gov/shortage-designation/hpsas

Housing Assistance Council . (2012). *TAKING STOCK: Rural People, Poverty, and Housing in the 21st Century.* Washington, D.C. : Housing Assistance Council.

HRSA. (2014). *Homelessness in Rural America* . Omaha, Nebraska: National Advisory Committee on Rural Health and Human Services.

Indiana Prevention Resource Center. (2019). *County Epidemiological Data*. Retrieved from Substance Abuse Treatment Episodes: https://iprc.iu.edu/epidemiological-data/epi_table.php?table_id=t901&county=69

Jones, E. B. (2017). Medication-Assisted Opioid Treatment Prescribers in Federally Qualified Health Centers: Capacity Lags in Rural Areas. *The Journal of Rural Health*, 14-22.

Kresina, T. F., & Lubran, R. (2011). Improving Public Health Through Access to and Utilization of Medication Assisted Treatment. *International Journal of Environmental Research and Public Health*, 4102-4117.

Larson, E., Patterson, D., Garberson, L., & Andrilla, H. (2016). *Supply and Distribution of the Behavioral Health Workforce in Rural America.* Seattle, WA: WWAMI Rural Health Research Center, University of Washington.

Lazere, E. B. (1989). *The Other Housing Crisis: Sheltering the Poor in Rural America.* Washington, D.C.: Center on Budget and Policy Priorities.

Medicaid. (2020, November 23). *Behavioral Health Services*. Retrieved from Medicaid Governmental Website: https://www.medicaid.gov/medicaid/benefits/behavioral-health-services/index.html#:~:text=Medicaid%20is%20the%20single%20largest,of%20substance%20use%20disorder%20services.

National Institute on Drug Abuse. (2020). *Opioid Summaries by State*. Retrieved from Indiana: Opioid- Involved Deaths and Related Harms: https://www.drugabuse.gov/drug-topics/opioids/opioid-summaries-by-state/indiana-opioid-involved-deaths-related-harms

National Institutes of Health. (2020, November 23). *National Institute on Drug Abue*. Retrieved from Principles of Drug Addiction: Research-Based Guide (Third Edition): https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/frequently-asked-questions/drug-addiction-treatment-worth-its-cost#:~:text=Substance%20abuse%20costs%20our%20Nation,cost%20of%20the%20treatment%2

Patrick, S., Burke, J., Biel, T., Auger, K., Goyal, N., & Cooper, W. (2015). Risk of Hospital Readmission Among Infants With Neonatal Abstinence Syndrome. *Journal of the American Academy of Pediatrics*, 513-519.

Piontak, J., & Schulman, M. (2014). Food Insecurity in Rural America. *SAGE Journals*, 75-77.

Robert Wood Johnson Foundation. (2012, October 25). *Public Infrastructure and Health Equity*. Retrieved from How Does Transportation Impact Health?: https://www.rwjf.org/en/library/research/2012/10/how-does-transportation-impact-health-

.html#:~:text=Transportation%20is%20a%20critical%20factor,and%20decreased%20health%20care%20costs.

Robert Wood Johnson Foundation. (2019). *County Health Rankings and Roadmaps*. Retrieved from Ripley County, Indiana: https://www.countyhealthrankings.org/app/indiana/2020/rankings/ripley/county/outcomes/overall/snapshot

Robert Wood Johnson Foundation. (2020). *County Health Rankings and Roadmaps*. Retrieved from Indiana- Overall Snapshot: https://www.countyhealthrankings.org/app/indiana/2020/rankings/ripley/county/outcomes/overall/snapshot

Ronquest, N., Wilson, T., Montejano, L., Nadpipelli, V., & Wollschlaeger, B. (2018). Relationship between buprenorphine adherence and relapse, health care utilization and costs in privately and publicly insured patients with opioid use disorder. *Substance Abuse and Rehabilitation Journal*, 59-78.

SAMHSA. (2021, 2 26). *SAMHSA*. Retrieved from Buprenorphine Practitioner Locator: https://www.samhsa.gov/medication-assisted-treatment/practitioner-program-data/treatment-practitioner-locator?field_bup_lat_lon_proximity%5Bvalue%5D=25&field_bup_lat_lon_proximity%5Bsource_configuration%5D%5Borigin_address%5D=47006&field_bup_city_value=&f

Shirk, C. (2008). *Medicaid and Mental Health Services* . Washington, D.C. : The George Washington University.

Stopka, T. J., Goulart, M. A., Meyers, D. J., Hutcheson, M., Barton, K., Onofrey, S., . . . Chui, K. K. (2017). Identifying and characterizing hepatitis C virus hotspots in Massachusetts: a spatial epidemiological approach. *BMC Infectious Diseases*, 294.

Substance Abuse and Mental Health Services Administration Center for Substance Abuse Prevention . (2008). *Substance Abuse Prevention Dollars and Cents: A Cost-Benefit Analysis* . Rockville, MD: U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES.

Tuttle, C. (2019). Snapping Back: Food Stamp Bans and Criminal Recidivism. *AMERICAN ECONOMIC JOURNAL: ECONOMIC POLICY*, 301-327.

Umer, A., Lilly, C., Hamilton, C., Breyel, J., Allen, L., Rompala, A., . . . John, C. (2020). Disparities in neonatal abstinence syndrome and health insurance status: A statewide study using non–claims real-time surveillance data. *Pediatric and Perinatal Epidemiology*.

Whetten, R., Pence, B., Reif, S., Conover, C., & Bouis, S. (2006). Does distance affect utilization of substance abuse and mental health services in the presence of transportation services? *AIDS Care*, 27-34.

Ziller, E. C., Anderson, N. J., & Coburn, A. F. (2010). Access to Rural Mental Health Services: Service Use and Out-of-Pocket Costs. *The Journal of Rural Health*, 214-224.